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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,086	06/24/2004	Keiichi Akagawa	04269/LH	5875
1933	7590	04/11/2005	EXAMINER	
FRISHAUF, HOLTZ, GOODMAN & CHICK, PC			KIANNI, KAVEH C	
767 THIRD AVENUE			ART UNIT	
25TH FLOOR			PAPER NUMBER	
NEW YORK, NY 10017-2023			2883	

DATE MAILED: 04/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/500,086	<b>Applicant(s)</b> AKAGAWA ET AL.	
	<b>Examiner</b> Kianni C. Kaveh	<b>Art Unit</b> 2833	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,12-14,25 and 28 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |



## **DETAILED ACTION**

Applicant's election without traverse of claims 1-3, 12-14, 25 and 28 in a paper submitted on 3/4/05 is acknowledged. The requirement is still deemed proper and is therefore made FINAL.

### **Drawings**

Figure 17a,b should be designated by a legend such as --prior Art- because only that which is old is illustrated. See MPEP j 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 'adjustment means' means that adjusts the film that changes the incident position" and "adjustment thickness" must be shown or the features) canceled from the claims). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Allowable Subject Matter***

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 3 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious the actuator substrate has characteristics that allow the

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transmission of infrared light in combination with the rest of the limitations of the base claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 12-14, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over combination of Edwards et al. (US 6404942) and Fan et al. (US 6449406).

Regarding claims 1 and 2, Edwards teaches a light beam switching and adjustment device (shown in at least fig. 1) comprising:

a light guide substrate 10 which has one or more input ports 18, a plurality of output ports 19', one or more mirror 20/22 receiving recesses that are formed in one surface of the light guide substrate 10, and light guides 11 that conduct the light that is input into the one or more input ports 18 to selected output ports 19' among the plurality of output ports in accordance with the advance and retraction of the one or more mirrors 22 with respect to one or more mirror receiving recesses (see at least col. 4, 2<sup>nd</sup> parag. and col. 5, last parag.); and

an actuator substrate 40 which has the one or more mirrors 22 and one or more actuators which are disposed in positions corresponding to the one or more mirrors so

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that these actuators support the corresponding mirrors (shown in fig. 2, wherein the switching element 20 containing actuating element(s) is considered to be actuator which corresponds to analogous teachings in specification as element 32; see at least col. 4, line 53-col. 5, 1<sup>st</sup> parag.; see col. 6, last parag.-col. 7, 1<sup>st</sup> parag.), and which position these corresponding mirrors on the side of one surface of the actuator substrate in a first position that is relatively far from this surface or in a second position that is relatively close to this surface, in accordance with signals (see at least fig. 1, 2 and 5H, and col. 6, last parag.-col. 7, 1<sup>st</sup> parag.); which is characterized in that

the light guide substrate 10 and the actuator substrate 40 are aligned and joined so that the first positions of the one or more mirrors are advanced positions with respect to the one or more mirror receiving recesses, and so that the second positions of the one or more mirrors are retracted positions with respect to the one or more mirror receiving recesses (see at least fig., 1, item receiving light mirror in an advance position with respect to other mirrors and col. 4, line 53-col. 5, 1<sup>st</sup> parag.; see col. 6, last parag.-col. 7, 1<sup>st</sup> parag.).

However, Edwards does not specifically teach (A) first alignment marks which are used to align the light guide substrate and the actuator substrate are formed on the light guide substrate, and second alignment marks which are used to align the light guide substrate and the actuator substrate are formed on the actuator substrate and (B) that the first and second alignment marks can be observed by means of infrared light. Although, it maybe argued that the mirror arrays constitute markings on the actuator substrate and plurality of trenches are second markings on the wave light

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substrate 10 and that an infrared viewing light can be used to view/observe the markings; nevertheless, the above limitation (A) is more specifically taught by Fan et al, in which two substrates are aligned using matching alignment marks (see col. 8, lines 20-49). Thus, Fan provides alignment tolerance for optimal switching device (see col. 7, last parag.). Thus, it would have been obvious to a person of ordinary skill in the art when the invention was made, using Edwards teachings on matching alignment markings on substrates, to modify Edwards' light guide and actuating substrates by devising matching alignment markings thereon--which can/is-possible be observed by means of infrared light--in order to align the substrates in precise manner since such alignment markings on substrates are conventional and since the resultant device would provide an optical switching mechanism that is functions efficiently, having low optical loss and less expensive (see col. 2, lines 26-45).

Regarding claim 12-13, as stated in rejection of claim 1, above, Edwards further teaches the light beam switching and adjustment device is characterized in that the light guide substrate and the actuator substrate are joined with a spacer 15 interposed so that the second positions of the one or more mirrors are positions in which the mirrors are completely retracted from the one or more mirror receiving recesses (shown in at least fig. 2 and 1, items substrates 40 and 10, and switch 20, having substrate with actuating mirror 22, receiving light Ls where other mirrors are in retracted positions); the spacer is disposed so that this spacer 15 surrounds the region in which the one or more mirrors are distributed on the actuator substrate (shown in at least fig. 1, item spacer(s))

16); the space 16 between the light guide substrate and actuator substrate is filled with a refractive index adjusting liquid which has a refractive index that is substantially the same as the refractive index of the core layers of the light guides so that this liquid enters the mirror receiving recesses, and the spacer forms a part of a sealing structure that seals the refractive index adjusting liquid (see at least fig. 1, item spacer 15 filled with index matching liquid in order to guide light through the waveguide cores 13; see at least 2<sup>nd</sup> parag of col. 1).

Regarding claim 25, Edwards teaches a method for manufacturing a light beam switching and adjustment device (shown in fig. 1; see abstract): comprising:  
a step of preparing a light guide substrate [i] which has one or more input ports, a plurality of output ports, one or more mirror receiving recesses that are formed in one surface of the light guide substrate, and light guides that conduct the light that is input into the one or more input ports to selected output ports among the plurality of output ports in accordance with the advance and retraction of one or more mirrors with respect to the one or more mirror receiving recesses (see at least figure 1 and col. 4, 2<sup>nd</sup> parag. and col. 5, last parag.)

a step of preparing an actuator substrate [j] which has the one or more mirrors and one or more actuators which are disposed in positions corresponding to the one or more mirrors so that these actuators support the corresponding mirrors, and which position these corresponding mirrors on the side of one surface of the actuator substrate in a first position that is relatively far from this surface or in a second position that is

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relatively close to this surface, in accordance with signals (see at least fig. 1, 2 and 5H, and col. 6, last parag.-col. 7, 1<sup>st</sup> parag.); and

a step of aligning and joining the light guide substrate and the actuator substrate so that the first positions of the one or more mirrors are advanced positions with respect to the one or more mirror receiving recesses, and so that the second positions of the one or more mirrors are retracted positions with respect to the one or more mirror receiving recesses.

receiving recesses, and so that the second positions of the one or more mirrors are retracted positions with respect to the one or more mirror receiving recesses; which is characterized in that when the spacer is joined between the light guide substrate and actuator substrate, the second positions of the one or more mirrors are positions in which the mirrors are completely retracted from the one or more mirror receiving recesses (see at least col. 4, line 53-col. 5, 1<sup>st</sup> prag.; see col. 6, last parag.-col. 7, 1<sup>st</sup> parag.).

Regarding alignment marks for substrates the arguments, the combinational teachings of, Edwards and Fan, presented in rejection of claim 1, above, is analogous in rejection of claim 25.

Regarding claim 28, as stated in rejection of claim 25, above, Edwards further teaches the actuators are constructed so that when absolutely no signals are supplied, the mirrors supported on these actuators return to specified positions that are farther from the actuator substrate on the first surface of this substrate than the second



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positions, and when the light guide substrate and the actuator substrate are aligned, specified signals are applied to the actuator substrate, so that all of the one or more mirrors are positioned in the second positions (see at least fig. 1, items moving switching mirrors 20 and col. 4, line 53-col. 5, 1<sup>st</sup> prag.; see col. 6, last parag.-col. 7, 1<sup>st</sup> parag.).

### ***Citation of Relevant Prior Art***

Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:

Al-hemyari et al. 6493482 teaches at least claim1

Hussein et al. 20020181852

Gloeckner et al. 6445841

Fernandez et al. 6445840

Fouquent 6195478

Dahmani et al. 20020061159

McDonald 6643426

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Cyrus Kianni whose telephone number is (571) 272-2417.

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The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 6:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached at (571) 272-2415.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231


**or faxed to:**

(703) 872-9306 (for formal communications intended for entry)

**or:**

Hand delivered responses should be brought to Crystal Plaza 4, 2021 South Clark Place, Arlington, VA., Fourth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'K. Kianni', followed by a long horizontal line.

K. Cyrus Kianni  
Patent Examiner  
Group Art Unit 2883

April 6, 2005